

## REMARKS

Claims 47 - 67 are pending in the application.

Please charge deposit account 02-1653 the amount of \$9.00 for one claim in excess of 20.

New application papers will be filled, as requested, in the near future.

Several of the claims have been amended to address the 35 USC 112 rejections raised by the Examiner. In addition, new claims 66 and 67 are being submitted to indicate that at the cleaning process temperature, where the organic component is present in the water at a concentration greater than its miscibility in the water, the liquid composition forms an **emulsion** of the organic component in the water.

In paragraph 4 on page 2 of the present Office Action, the Examiner indicates that the range for the amount of water in the claims is new matter. Applicant respectfully submits that this information is contained in the instant CIP application. Perhaps the page numbers indicated do not correspond with the copy on file. However, the indicated range of water can be found in a paragraph starting "In an especially preferred embodiment...".

With regard to claim 61, it is respectfully submitted that this claim has now been amended to make it chemically correct. With regard to "-NR<sup>1</sup>", it is furthermore respectfully submitted that this is in fact a chemical possibility, since there are two free binding possibilities. With regard to the "-CH<sub>2</sub>- groups", it should be noted that claim 61 merely indicates that if one or more of such groups are present, then they may be

replaced. Of course, if there are no nonadjacent -CH<sub>2</sub> groups, then there would be no replacement.

With regard to paragraph 9 of the Office Action, Applicant respectfully submits that the Examiner's comment is not correct. In particular, a liquid composition having an azeotropic behavior need not have its components in the same percentages as its vapor, which includes the components in a predetermined percentage. Thus, claim 51 merely provides for the specific example where the liquid does have the same percentage composition of its components as does the vapor.

As defined in independent claims 47 and 54, the liquid cleaning composition of the present invention comprises at least 65% water and an organic component that at the cleaning process temperature is present in the water at a concentration greater than its miscibility in the water (thus providing a miscibility gap at the cleaning process temperature), whereas at a different temperature or concentration, the organic component is completely dissolvable in the water so as to form an optically clear liquid.

With regard to EP 0 475 596, this reference discloses a cleaning method where articles are to be cleaned by a liquid solvent that is a hydrogenated or dehydrogenated terpene or an analog of terpene, which is immiscible with water (see column 4, line 57). The solvent contamination that remains on the surface of the articles after the terpene cleaning stage is removed azeotropically by forming an azeotrope with an aqueous medium (see column 4, line 7). This azeotroping (i.e. the removing of terpene residue from the terpene contaminated surface of articles after their cleaning by contact with the liquid solvent, preferably with the additional use of ultrasound) is preferably conducted

at temperatures below 100°C (see column 6, lines 25 and 26). As furthermore indicated in column 6, lines 44 - 51, a preferred way of contacting the article with the aqueous medium is to contact the contaminated surface at about 98°C, wherein the aqueous medium is applied as steam, which can consist substantially only of water vapor or can comprise water vapor and a spray of water near its boiling point. It is also possible to immerse the contaminated article into hot aqueous medium and to then lift it out and allow azeotroping to occur at the surface of the article (see column 7, lines 2 - 6).

It is therefore respectfully submitted that EP 0 475 596 neither teaches nor suggests the subject matter claimed in independent claims 47 and 54 of the present application. In particular, the cleaning of the articles in the cited reference is undertaken with a solvent, either terpene or an analog thereof, which is completely immiscible with water. The removal of solvent residues from the surface of the cleaned articles is accomplished via contact with water vapor. There is no teaching or suggestion of the inventive feature of using a liquid cleaning composition as defined in claims 47 or 54, in particular, where a miscibility gap exists at the cleaning process temperature. The inventive liquid cleaning composition provides a surprisingly high cleaning efficiency despite the low concentration of organic component.

With regard to WO 96/28535, this reference discloses a cleaning process wherein (see the abstract) articles that are to be cleaned are contacted in a first step by a liquid cleaning composition comprising 0.01 to 80 weight % of water and 99.99 to 20 weight % of an organic solvent having the features of i) forming an azeotrope with water and ii) forming a separate phase after azeotropic distillation. In a second step, the

cleaned articles are rinsed with a cleaning agent containing 99.99 to 60 weight % water and from 0.01 to 40 weight % of the organic solvent, whereby the water content in the rinsing agent is higher than the water content in the cleaning agent. Used cleaning and rinsing agent are recombined and are subjected to azeotropic distillation. The azeotrope is separated into a water-rich and a solvent-rich phase and is recycled.

As stated on page 3, lines 6 - 8, the percentage of water in the cleaning agent may be higher than its solubility in the organic solvent at a given cleaning temperature; in such a case, the cleaning agent is an emulsion. The preferred organic solvent is, similar to the present invention, propylene glycol-n-butyl ether. However, in contrast to the teaching of the present invention, where the cleaning agent forms an emulsion of the type organic component in water (i.e. organic rich droplets in a continuous water rich phase), the cited reference WO 96/28535 teaches using a cleaning agent that is clear (i.e. a true solution) or which forms an emulsion of the type water rich droplets in a continuous organic rich phase, in other words, the opposite of the composition of the present invention as defined in claims 47 and 54. In particular, the preparation of the inventive cleaning agent of the present invention is such that, for example at the cleaning process temperature, the organic solvent is added to water in such an amount that the clear solution that forms at the beginning of the addition of the solvent due to solubility of the organic component in water, becomes an emulsion since the solubility or miscibility of the organic component in the water is exceeded. In distinct contrast, the cleaning agent of the cited reference is prepared such that water is added to the pure organic solvent in such an amount that the water is soluble in the organic

component, to form a clear solution, or optionally the solubility of the water in the solvent is exceeded and an emulsion is formed. Again, this is the opposite of, and teaches away from, the present invention.

In summary, pursuant to the teaching of the present invention, cleaning of dirty articles is accomplished with an emulsion of the type organic compound in water; in other words, there is a low concentration of the organic component. However, despite this low concentration of organic solvent, due to the emulsion or miscibility gap condition, excellent cleaning results are achieved. In contrast, pursuant to the teaching of WO 96/28535 cleaning is carried out with a clear solution of water in organic (i.e. a high organic concentration), or optionally with an emulsion of the type water in organic. There is no suggestion of any advantage to be achieved by cleaning with an emulsion. Furthermore, the concentration of the organic solvent in this reference is high, so that organic solvent residue adheres to the surface of the cleaned articles (see, for example, page 7, line 3). The rinsing agent preferably includes more than 70% water and less than 30% organic solvent, and may be such that the percentage of the organic solvent is higher than its solubility in water, thereby forming an emulsion (see the top of page 16). The rinsing agent, the composition of which is not well defined due to the fact that it contains differing amounts of the cleaning agent adhering to the articles that are to be rinsed, could correspond to that of the inventive cleaning agent. Nonetheless, it is respectfully submitted that the inventive cleaning method and cleaning composition are not taught or suggested by the cited reference, the cleaning agent of which is an organic rich composition, with only the rinsing agent, which is intended to remove

organic residue, being an organic poor composition. It is respectfully submitted that the teaching of the present invention, namely that an organic poor liquid composition that is in a miscibility gap condition at the cleaning process temperature, and that exhibits a cleaning behavior that is as good as or even better than cleaning with either a pure solvent or pure water, is a surprising result for one having ordinary skill in the art.

Thus, as indicated above and in Applicant's previous amendment, the distinctions between the present invention and the cited art are that with the liquid cleaning composition as defined in independent claims 47 and 54 of the present invention, the liquid cleaning composition with which an article that needs cleaning is brought into contact comprises at least 65% by weight water, and an organic component that at the cleaning process temperature is present in the water at a concentration greater than its miscibility in the water. Neither reference teaches nor suggests a liquid cleaning composition defined in this manner. WO 96/28535 even teaches the opposite, namely the presence of water in an organic solvent in a concentration of the water that is greater than the miscibility of the water in the solvent. It is respectfully submitted that the Examiner has not specifically addressed these distinctions.

Although Applicant respectfully submits that the claims of the present application as amended should now be in condition for allowance, should the Examiner have any further comments or suggestions, the undersigned would very much welcome a telephone interview with him to at least resolve any continuing 112 rejections, and

hopefully to also discuss appropriate claim language that will place the application into condition for allowance.

Respectfully Submitted,



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**VERSION WITH MARKINGS TO SHOW CHANGES MADE:**

47. A method of cleaning an article with an active liquid cleaning composition, including the step of:

bringing into contact with an article a liquid cleaning composition comprising at least 65% by weight water and an organic component containing molecules having lipophilic and hydrophilic groups, wherein at a cleaning process temperature [that prevails during a cleaning process], said organic component is present in said water at a concentration greater than its miscibility in said water, whereas at at least one of a different temperature and a different concentration, said organic component is completely dissolvable in said water so as to form an optically clear liquid.

49. A method according to claim 47, which includes [the] a step of undertaking cleaning under the effect of ultrasound.

50. A method according to claim 47, wherein said liquid cleaning composition is an azeotrope, and which furthermore includes the [step] steps of vaporizing said liquid cleaning composition, and of causing vapor from said liquid cleaning composition to condense on said article that is to be cleaned therewith.

54. A liquid cleaning composition for cleaning an article, comprising:

at least 65% water; and  
an organic component containing molecules having lipophilic and hydrophilic groups, wherein at a cleaning process temperature [that prevails during a cleaning process], said organic component is present in said water at a concentration

greater than its miscibility in said water, whereas at at least one of a different temperature and a different concentration, said organic component is completely dissolvable in said water so as to form an optically clear liquid.

61. A liquid cleaning composition according to claim 54, wherein said organic component is a solvent having the general formula:



where  $R^1$  and  $R^3$  are each independently selected from the group consisting of H,  $CH_3$ ,  $C_2H_{15}$ , straight-chain or [branched saturated  $C_2$  to  $C_{18}$  alkyl groups, straight-chain or] branched, saturated or unsaturated  $C_3$  to  $C_{18}$  alkyl groups, [saturated or unsaturated cyclic  $C_3$ - to  $C_8$  groups] in which one or more nonadjacent  $-CH_2-$  groups may be replaced by  $-O-$ , [hydroxy, alkoxy, and amino in which one or both hydrogens] imido in which the hydrogen may be replaced by  $C_1$  to  $C_8$  alkyl groups, saturated or unsaturated cyclic  $C_3$  to  $C_6$  groups, in which one or more nonadjacent  $-CH_2-$  groups may be replaced by  $-O-$ , imido in which the hydrogen may be replaced by  $C_1$  to  $C_8$  alkyl groups;

$X$  is selected from the group consisting of  $-O-$ ,  $-C(=O)-$ ,  $-C(=O)-O-$ ,  $-NH-$ ,  $-NR^1$ ,  $-N(OH)-$ , straight-chain or branched  $C_2$  to  $C_8$  alkylene groups in which one or more nonadjacent  $-CH_2-$  groups may be replaced by  $-O-$ ;

and  $n$  represents whole integers.

62. A liquid cleaning composition according to claim 54, which further includes at least one of the group consisting of a [not spontaneously evaporating] cleaning reinforcer and a corrosion protection additive, which are distillable together with the liquid cleaning composition.

63. A liquid cleaning composition according to claim 54, wherein said organic component [includes a] comprises glycol ether as well as [a further] another organic component.